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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

Tsuyoshi YAMAMOTO, et al.

Serial No: 10/706,059

Filed: November 12, 2003

Confirmation No.: 6351

For: TILT CONTROL METHOD AND APPARATUS FOR OPTICAL DISC RECORDING AND PLAYBACK APPARATUS

Art Unit: 2627

Examiner: Thomas D. Alunkal

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APPEAL BRIEF

Mail Stop Appeal Brief
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Dear Sir:

This is an Appeal from the Examiner's final rejection of claims 1-4. The final rejection issued on October 16, 2006 and the Notice of Appeal was sent to the Patent and Trademark Office on February 9, 2007.

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(i) REAL PARTY IN INTEREST

The real party in interest is Sanyo Electric Co. Ltd., Osaka, Japan.

(ii) RELATED APPEALS AND INTERFERENCES

None.

(iii) STATUS OF CLAIMS

Claims 1-4 are pending. In the final Office Action of October 16, 2006, claims 1-4 are rejected.

(iii) STATUS OF AMENDMENTS

This Appeal is being filed in response to the final rejection of October 16, 2006. Subsequently, Applicants filed a Response To Final Office Action on December 4, 2006 which did not amend any of claims 1-4 but which presented remarks and arguments. On January 24, 2007, an Advisory Action issued stating that Applicants' response of December 4, 2006 fails to place the application in condition for allowance. The Advisory Action further states that the final rejection of October 16, 2006 is maintained for the reasons set forth in the answer to arguments section of the Office Action.

(v) SUMMARY OF CLAIMED SUBJECT MATTER

Claim 1

Claim 1 recites a tilt control method in an optical pickup including a tilt adjustment coil (7) for adjusting the tilt of an objective lens (page 5, line 8 of the specification), comprising three steps. The steps include recording an offset adjustment signal in a test recording area provided on an optical disk (page 9, lines 5 and 6). The offset adjustment signal is recorded while modifying a driving signal level supplied to the tilt adjustment coil (page 10, lines 1-6). Thereafter, an RF signal of the offset adjustment signal that was recorded on the optical disk is played back (page 10, lines 20-24). This is followed by a final step of detecting a positive peak level (A1) and a negative peak level (A2) in the RF signal of the offset adjustment signal that was played back, and setting the driving signal level, when a β value obtained from $\beta = (A1+A2)/(A1-A2)$ reaches a maximum, as an offset value for the driving signal to be supplied to the tilt adjustment coil (page 11, lines 11-17, and page 6, lines 6-13).

Claim 2

Claim 2 defines a tilt control method in accordance with claim 1, wherein the tilt control is performed by adding the set offset value to a tilt signal for performing tilt control and supplying the added signal to the tilt adjustment coil (page 7, lines 16-22).

Claim 3

Claim 3 defines a tilt control apparatus (Fig. 1) for adjusting the tilt of an objective lens in an optical pickup (page 5, lines 7 and 8). The apparatus includes a signal recording circuit (18) for recording a signal by irradiating light onto a disk (1) via the objective lens (page 10, lines 7-14). The apparatus further includes a photo detector circuit (4) for obtaining an RF signal by detecting reflected light from the disk (1) via the objective lens (page 5, lines 26-28 and page 6, lines 1-2). The apparatus further includes a β value detector circuit (12) for detecting a positive

peak level (A1) and a minus peak level (A2) in the RF signal from the photo detector circuit (4), and detecting the β value obtained from β = (A1+A2)/(A1-A2) (page 6, lines 6-13). The apparatus still further includes a tilt control coil (7) for controlling the tilt of the objective lens (page 5, lines 6-8). Further included within the apparatus is a tilt control circuit (13) for controlling the driving signal level supplied to the tilt adjustment coil (7) (page 7, lines 1-10). An offset adjustment signal is written to the disk by recording a signal to the disk by the signal recording circuit while the tilt control circuit modifies the driving signal level to the tilt control coil, and the relationship between driving signal level and recording position is stored (page 10, lines 1-6). The photo detector circuit (4) detects an RF signal of the offset adjustment signal that was recorded on the disk (page 5, lines 26-28 and page 6, lines 1 and 2). The β value detector circuit (12) detects a β value (page 6, lines 6-13). The tilt control circuit (13) uses the driving signal level for the tilt control coil (7) corresponding to the maximum of the detected β value as an offset value for tilt control (page 7, lines 1-10).

Claim 4

Claim 4 defines a tilt control circuit in accordance with claim 3 in which the tilt control circuit performs tilt control by adding the offset value to a tilt signal for performing tilt control in supplying this to the tilt adjustment coil (page 7, lines 16-22).

(vi) THE GROUND OF REJECTION TO BE REVIEWED ON APPEAL

The ground of rejection to be reviewed on appeal is the rejection of claims 1-4 under 35 U.S.C.§ 103(a) as being unpatentable over U.S. Patent 6,434,096 of Akagi et al. in view of U.S. Patent 7,046,600 of Matsumoto.

(vii) ARGUMENT REGARDING THE GROUND OF REJECTION

In rejecting claims 1-4 as unpatentable over Akagi, et al. in view of Matsumoto, Matsumoto is relied upon as disclosing the use of a maximum β value obtained from a reproduction signal. Akagi, et al. on the other hand, is relied upon as disclosing setting an offset value supplied to a tilt adjustment coil.

In a prior office action, it was pointed out that Akagi, et al. disclosed, by way of Figure 17 and elements 318, 320, 312, 313 and 403 as well as discussion pertaining thereto that the current supply to a tilt adjustment coil (element 403 in Fig. 17) is based on an offset adjustment signal (elements 318, 320 and 312 of Fig. 17). In view of this, Akagi, et al. is said to disclose performing control of a current supplied to a tilt adjustment coil based on the offset adjustment signal. As still further stated, it would have been obvious to combine the disclosed teachings of Matsumoto and Akagi so as to arrive at the claimed subject matter. Akagi et al. is said to disclose problems that arise from optical pickup defects, and that all of the problems listed result in poor recording quality. Matsumoto is said to disclose the use of a setting of a driving signal level based on a maximum β value (lines 1-4 of column 11, element 24 of Fig. 5, and Fig. 3). Figure 3 of Matsumoto is said to show that there is a decrease in error value with a maximum β value, such that one of ordinary skill in the art at the time of the invention would have been motivated to combine the teachings of Akagi, et al. and those of Matsumoto because Matsumoto discloses reducing error value, and that in turn increases recording efficiency which helps improve the deficiencies disclosed by Akagi, et al.

Claims 1-4 disclose features in accordance with the invention which include (1) recording an offset adjustment signal in a test recording area provided on an optical disk, wherein the offset adjustment signal is recorded while modifying a driving signal level supplied to the tilt adjustment coil, and (2) playing back an RF signal of the offset adjustment signal that was recorded to the optical disk. A previous Office Action stated that such features are disclosed at lines 40-42 of

column 12 of Akagi. However, such portion of Akagi is "The offset amount of the tilt error signal depending on the movement direction of the optical pickup is stored beforehand, the above-mentioned stored offset is read". However, according to Fig. 17 of Akgai, offset detection circuit 318 detects offset based on a signal from tilt sensor 310 and the detected offset value is stored in a memory circuit 319. An offset correction circuit 320 provides the tilt adjustment signal.

Therefore, Akagi does not show or suggest the features (1) and (2) in accordance with the invention which are noted above. More specifically, Akagi does not show or suggest (1) recording an offset adjustment signal in a test recording area provided on an optical disk, wherein the offset adjustment signal is recorded while modifying a driving signal level supplied to the tilt adjustment coil, and (2) playing back an RF signal of the offset adjustment signal that was recorded to the optical disk. Matsumoto only shows features concerning β value and does not show or suggest the features (1) and (2) of the present invention.

Claim 1 defines a tilt control method which includes "recording an offset adjustment signal in a test recording area provided on an optical disk, wherein said offset adjustment signal is recorded while modifying a driving signal level supplied to said tilt adjustment coil" and "playing back an RF signal of said offset adjustment signal that was recorded on the optical disk". Consequently, claim 1 is submitted to clearly distinguish patentably over the prior art.

Claim 2 depends from and contains all of the limitations of claim 1 so as to also distinguish patentably over the art.

Claim 3 defines a tilt control apparatus which includes the features of the present invention so as to distinguish patentably over the art.

Claim 4 depends from and contains all of the limitations of claim 3 so as to also distinguish patentably over the prior art.

CONCLUSION

It is therefore respectfully requested that the final rejection of claims 1-4 be reversed, and that such claims be determined to be allowable.

Please charge the fee for this Appeal Brief to our Deposit Account No. 50-1314. Any other fees due should also be charged to our Deposit Account No. 50-1314.

Respectfully submitted,

HOGAN & HARTSON L.L.P.

Date: March 26, 2007

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(viii) CLAIM APPENDIX

1. A tilt control method in an optical pickup including a tilt adjustment coil for adjusting the tilt of an objective lens, comprising the steps of:

recording an offset adjustment signal in a test recording area provided on an optical disc,

wherein said offset adjustment signal is recorded while modifying a driving signal level supplied to said tilt adjustment coil;

thereafter playing back an RF signal of said offset adjustment signal that was recorded on the optical disc; and

detecting a positive peak level (A1) and a negative peak level (A2) in the RF signal of said offset adjustment signal that was played back, and setting said driving signal level, when a β value obtained from $\beta = (A1+A2)/(A1-A2)$ reaches a maximum, as an offset value for the driving signal to be supplied to the tilt adjustment coil.

2. A tilt control method according to claim 1, wherein:

the tilt control is performed by adding the set offset value to a tilt signal for performing tilt control and supplying the added signal to said tilt adjustment coil.

3. A tilt control apparatus for adjusting the tilt of an objective lens in an optical pickup comprising:

a signal recording circuit for recording a signal by irradiating light onto a disc via said objective lens;

a photo detector circuit for obtaining an RF signal by detecting reflected light from the disc via said objective lens;

a beta value detector circuit for detecting a positive peak level (A1) and a minus peak level (A2) in the RF signal from said photo detector circuit, and detecting the ß value obtained from ß = (A1+A2)/(A1-A2);

a tilt control coil for controlling the tilt of said objective lens; and

a tilt control circuit for controlling the driving signal level supplied to said tilt adjustment coil;

an offset adjustment signal is written to the disc by recording a signal to the disc by said signal recording circuit while said tilt control circuit modifies the driving signal level to the tilt control coil, and the relationship between driving signal level and recording position is stored;

said photo detector circuit detects an RF signal of the offset adjustment signal that was recorded on the disc;

said beta value detector circuit detects a ß value; and

the tilt control circuit uses the driving signal level for the tilt control coil corresponding to the maximum of the detected ß value as an offset value for tilt control.

4. A tilt control circuit according to claim 3, wherein:

said tilt control circuit performs tilt control by adding said offset value to a tilt signal for performing tilt control and supplying this to said tilt adjustment coil.

(ix) EVIDENCE APPENDIX

None.

(x) RELATED PROCEEDINGS APPENDIX

None.